REMARKS

In the Action, claims 9-14 are rejected. In response, claim 9 is amended to include the subject matter of claim 10 and to recite that the microcapsule composition is in the absence of a binder. Claim 10 is cancelled. The pending claims in this application are claims 9 and 11-14, with claim 9 being the sole independent claim.

In view of these amendments and the following comments, reconsideration and allowance are requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 9, 10 and 12-14 are rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,017,584 to Albert et al. in view of U.S. Patent Publication No. 2002/0131152 to Liang et al. Albert et al. is cited for disclosing encapsulated electrophoretic displays and materials for producing the displays. Liang et al. is cited for disclosing microcapsules having the claimed particle size distribution. The rejection is based on the position that it would have been obvious to modify the composition of Albert et al. having the particle size of Liang et al.

Claim 1 as amended is directed to a microcapsule composition comprising an aqueous medium and a plurality of microcapsules encapsulating a dispersion of a solvent and electrophoretic fine particles and where the composition comprises 30 to 80% by weight of the microcapsules where the microcapsules have a volume average particle diameter of 30 to 150 μm, not less than 80% by volume of the microcapsules are within the particle diameter range of ±40% of the maximum peak particle diameter around the maximum peak particle diameter and where the microcapsule composition is in the absence of a binder, and includes not less than 90% by weight of the microcapsules and the aqueous medium. Albert et al. and

Liang et al. either standing alone or in combination do not disclose or suggest the claimed composition.

Claim 1 is directed to a microcapsule composition including an aqueous medium as an essential component of the microcapsule composition that does not include a binder as in the cited patents. The absence of a binder in the claimed microcapsule composition provides an improved storage stability of the microcapsule composition as disclosed on page 30, lines 21-22, page 31, lines 1-2, page 32, lines 1-2, and the Working Examples in the specification. The claimed microcapsule composition which does not contain a binder can be mixed or combined with a binder prior to use for forming a coating composition that can be applied for electrophoretic displays or films. As noted in the Action and as specifically disclosed in Albert et al., the composition of Albert et al. contains a binder. The presence of the binder in the composition of Albert et al. reduces the storage stability when compared to the claimed composition. Thus, the claimed microcapsule composition differs significantly from the composition of Albert et al.

As noted above, the absence of the binder in the microcapsule composition improves the storage stability of the microcapsule composition. In contrast, the binder in the microcapsule composition as disclosed in Albert et al. exhibits several disadvantages. For example, the presence of the binder in the composition of Albert et al. inhibits the microcapsules from being uniformly dispersed. Moreover, the presence of the binder in the composition of Albert et al. causes aggregation of the microcapsules such that the composition cannot be successfully applied or dispersed on a substrate. Albert et al. provides no suggestion or teaching of the claimed composition.

The advantages and stability of the claimed microcapsule composition are also provided by the amount of the microcapsules in the microcapsule composition. As disclosed

on page 29, lines 9-18, an amount of microcapsules greater than 80 wt% based on the weight of the composition causes aggregation of the microcapsules and reduces the dispersibility of the composition. Aggregation of the microcapsules can reduce the image quality in the resulting display. In addition, attempts to disperse the aggregated microcapsules can result in damage to the microcapsules so that the electrophoretic fine particles leak from the microcapsules, thereby reducing the image quality of the display.

Albert et al. does not disclose or suggest a microcapsule composition having a microcapsule content in the amount of the 30 to 80% by weight as claimed. Albert et al. further fails to disclose or suggest the claimed volume average diameter of 30 to 150 μm as recited in claim 9. The Action refers to various passages of Albert et al. that relate to the microencapsulation process, shell materials and encapsulated particles. These passages when taken as a whole do not suggest the claimed microcapsule composition.

As discussed in the specification, the particle size distribution of the microcapsule composition of the present invention is important in providing the desirable properties of the composition and the resulting electrophoretic display produced from the composition. Albert et al. does not disclose an average particle diameter distribution, and thus, provides no teaching or incentive to one of ordinary skill in the art to provide the claimed volume average particle diameter. Obviousness is not established by one skilled in the art being capable of attaining the claimed property unless there is some teaching or suggestion to do so. Albert et al. clearly fails to provide any teaching or suggestion of a microcapsule composition having the claimed volume average particle diameter.

Albert et al. does not disclose or suggest a method that is capable of producing the claimed volume average particle diameter. The classification step as disclosed in the present specification is used to obtain the microcapsules having the claimed volume average particle

diameter distribution. For example, page 26, line 16 to page 27, line 1 of the specification discloses a wet classification step used to obtain the volume average particle diameter distribution. A dry classification step as in the prior processes result in broken or damaged microcapsules. The damaged or broken microcapsules are not capable of producing the volume average particle diameter of the claimed invention. Thus, claims 12 and 13 which depend from claim 9 are not simply process limitations as suggested in the Action, but define the resulting volume average particle diameter and the microcapsule composition.

The differences between the conventional dry classification step for producing microcapsules and a wet classification step according to the present invention are apparent from the Examples and Comparative Examples in the specification. For example, Comparative Example 1 on pages 42 and 43 results in microcapsules having a particle size outside the claimed range. On the other hand, Example 1 on page 37 of the specification discloses the microcapsule dispersion being subjected to a wet classification step and concentrating the dispersion to obtain a volume average particle diameter of 74.6 μm and a maximum-peak particle diameter of 77.2 μm. The resulting microcapsule composition as disclosed in Table 1 on page 46 demonstrates that not less than 80% by volume of the microcapsules have a particle diameter range of ±40% of the maximum peak particle diameter as recited in claim 9.

In view of the above, it is apparent that the microcapsules of Albert et al. are outside the claimed range. Furthermore, the art of record provides no suggestion of producing a microcapsule composition having the claimed volume average particle diameter.

Liang et al. is cited for the position that it would have been obvious to modify Albert et al. to attain the claimed particle diameter. The Action refers to paragraph 0007 of Liang et al. as allegedly suggesting modifying the particle size distribution to within the claimed

range. However, this passage in Liang et al. refers to the prior art electrophoretic displays prepared from the prior microencapsulation processes. This passage points out the deficiencies of the prior art electrophoretic displays obtained from microcapsules. Liang et al. discloses the low charge density or zeta potential of the pigment particles in the microcapsules as a result of the large particle size and broad size distribution of the microcapsules. This passage provides no suggestion or teaching to modify the particle size of Albert et al. Furthermore, Liang et al. provides no suggestion that modifying the particle sizes of Albert et al. would overcome the deficiencies of the prior art referred to in the cited passage.

Liang et al. is directed to an electrophoretic display comprising cells of well defined shape, size and aspect ratio where the cells are filled with charged pigment particles dispersed in a dielectric solvent. Liang et al. does not relate to microcapsules. Thus, Liang et al. clearly provides no suggestion of narrowing the microcapsule size distribution as suggested in the Action. Liang et al. further provides no suggestion of modifying the microcapsules of Albert et al. as in the claimed invention. Liang et al. would appear to suggest to one of ordinary skill in the art that the advantages of the Liang et al. invention can be obtained without the use of microcapsules as in Albert et al. Accordingly, Liang et al. provides no suggestion or teaching to optimize the microcapsule particle diameter of Albert et al. as suggested in the Action.

In view of the above comments and the deficiencies of Albert et al. and Liang et al., claim 9 would not have been obvious to one of ordinary skill in the art over Albert et al. in view of Liang et al. Claims 11-14 are also allowable as depending from an allowable base claim and for reciting additional features of the invention. For example, Albert et al. and Liang et al. do not disclose the thickness of the shell of the microcapsules as in claim 11, the

process of obtaining the microcapsules as in claims 12 and 13, or the amount of the microcapsules of claim 14, in combination with the features of claim 9.

Claims 9-14 are also rejected as being obvious over U.S. Patent Publication 2001/0046081 to Hayashi et al. in view of Liang et al. Hayashi et al. is cited for substantially the same reasons as Albert et al.

As noted in the Action, Hayashi et al. does not disclose or suggest the weight% of the microcapsules present in the composition or the volume average particle diameter of claim 9. Hayashi et al. is relevant only to the extent that a microcapsule composition is disclosed for producing an electrophoretic display. The Action suggests that Hayashi et al. refers to the particle diameter of the microcapsules being "about 25 μm" which allegedly reads on the claimed volume average particle diameter of 30 to 150 μm. Although the term "about" allows for some variation of the recited amount, a variation of 20% is not a reasonable variation. One skilled in the art would not interpret the term "about" as encompassing a range of 20% more or less of the cited value. Thus, the disclosed particle diameter of Hayashi et al. does not reasonably suggest the claimed particle diameter as suggested in the Action. Furthermore, Hayashi et al. clearly fails to disclose or suggest a volume average particle diameter of 30 to 150 μm as recited in claim 9.

For the reasons discussed above, Liang et al. does not provide the deficiencies of the primary references. Liang et al. does not disclose a microcapsule composition, and thus, provides no teaching or suggestion to one of ordinary skill in the art to provide the claimed microcapsule composition having the claimed volume average particle diameter. Liang et al. clearly provides no suggestion to modify the composition of Hayashi et al. to attain the claimed volume average particle diameter or to produce a composition comprising 30 to 80% by weight of the microcapsules.

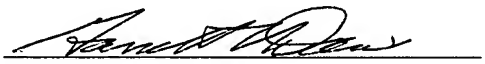
Liang et al. discloses that the prior electrophoretic display devices have certain disadvantages based on the particle diameter of the microcapsules. However, Liang et al. provides no suggestion of how to modify the microcapsule particle size and provides no suggestion of modifying the microcapsules to within the claimed volume average particle diameter. Liang et al. does not indicate whether the microcapsule particles should be increased or decreased according to the prior display devices, but merely points out the deficiencies of the prior display devices. Liang et al. provides no suggestion of how to avoid the disadvantages of the microcapsule particle size of the prior display devices or to modify the microencapsulation process to attain a different microcapsule particle size. Liang et al. specifically overcomes the disadvantages of the prior display devices using the microcapsules by avoiding the use of the microcapsules entirely.

The Action further indicates that Liang et al. suggests reducing the particle size of the microcapsules of the prior display devices. Thus, according to the suggestion in the Action, Liang et al. would suggest reducing the particle size diameter of the microcapsules of Hayashi et al. which would clearly result in the microcapsules being well below the claimed range. Thus, according to the suggestions in the Action, Liang et al. teaches a microcapsule composition outside the claimed range.

In view of the above comments, claims 9-14 are not obvious over the combination of Hayashi et al. and Liang et al. Claims 11-14 are allowable as depending from claim 9 and for reciting the various features of the invention that are not disclosed or suggested in the art of record. Hayashi et al. and Liang et al. do not disclose the thickness of the shell of the microcapsules as in claim 11, the process for producing the microcapsules of claims 12 and 13, or the amount of the microcapsules as in claim 14.

In view of these amendments and the above comments, the claims are submitted to be allowable over the art of record. Accordingly, reconsideration and allowance are requested.

Respectfully submitted,



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